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A NEW CORSICAN *HYDROPTILA* SPECIES (TRICHOPTERA)

By Martin E. Mosely, F.R.E.S.

In (1932, *Eos*, **8** : 176, 180), I recorded *Hydroptila tigurina* Ris as having been taken in the neighbourhood of Corte in Corsica. At the time I was unacquainted with the species and relied upon the very good description and figure given by Dr. Ris in 1894, *Mitt. schweiz. ent. Ges.* **9** : 133.

Recently, I have been able to examine British examples of *tigurina* in considerable numbers, and it became apparent that although they resembled the Corsican insect very closely, yet they differed in certain characters of the genitalia.

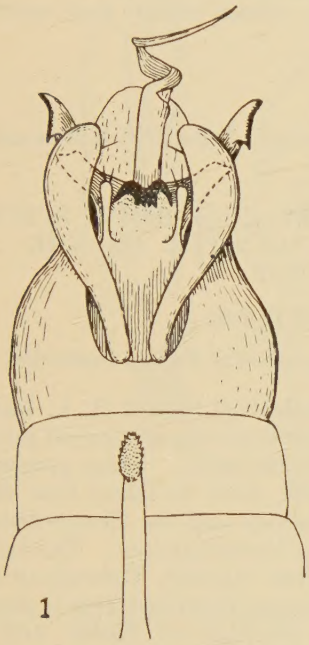

Fig. 1.—*Hydroptila cortensis* sp. n., ♂, genitalia, ventral.

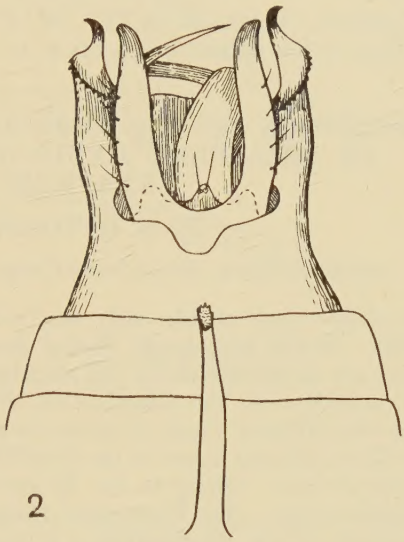

Fig. 2.—*Hydroptila tigurina* Ris, ♂, genitalia, ventral.

I accordingly wrote to Dr. O. Schneider-Orelli at Zurich, where the Ris collection is lodged, and he very kindly sent me a paratype of *tigurina*.

A comparison of this with the British and Corsican examples has shown that the British are correctly determined as *tigurina*, whilst the Corsican insect is new to science and it is described below as *H. cortensis* sp. n.

This will entail the removal of *H. tigurina* from the French list as there seems to be no other record of the species in France.

Hydroptila cortensis sp. n. (fig. 1).

Hydroptila tigurina Mosely *nec* Ris, 1932, *Eos*, **8** : 176, 180, pl. 5, fig. 1.

The single example of the species was collected in fluid so that no description of its general appearance is possible. The scent-organ, of which a photograph was reproduced in 1932, *Eos*, **8**, takes the form of membranes covered with

androconia, lining the scent-organ caps and a tuft of scent-hairs at the base of each cap.

It will be seen from the figures that the genitalia conform closely to the *tigurina* pattern (fig. 2). Differences are apparent, more particularly in the form of the inferior appendages and the lower penis-cover.

Genitalia, ♂. There is a membranous dorsal plate beneath which is seen the penis, the apex of which is bent round nearly at right angles, the curve being slightly sharper than in *tigurina*. The sides of the 9th segment are produced into narrow plates the posterior margins of which are truncate with the angles of the truncation slightly produced; lower penis-cover with two wide-spread arms with truncate apices and a pair of black, divergent and down-turned hooks arising at their centre from a common base; beneath and outside these hooks is a pair of slender, finger-like processes, each armed with a pair of bristles at its apex. Inferior appendages narrow at their bases, dilated towards their incurving apices; ventral process of the 7th segment very long.

Length of the anterior wing, ♂, 2 mm.

Corsica: Corte, 28.viii.1931 (*M. E. Mosely*).

Type ♂ in a balsam preparation, in the collection of the British Museum.

DESCRIPTION OF THE EGGS AND LARVAE OF FOUR SPECIES OF CHALCIDOID HYMENOPTERA PARASITIC ON THE KNAPWEED GALL-FLY

By G. C. Varley, B.A., F.R.E.S.

(*Research Fellow, Sidney Sussex College, and Department of Zoology, Cambridge.*)

The classic work on the early stages of the Chalcids is that of H. L. Parker (1924). In this monograph Parker recognises seven groups of Chalcid larvae, which are distinguished by the structure of the first instar. These groups do not coincide with the classification of the adults, since he found that there were two different types of larvae in the Torymidae and the Eurytomidae, and three different types in the Encyrtidae and Pteromalidae. The larvae described below belong to the Eurytomidae (two species), Torymidae and Pteromalidae. The Pteromalid *Habrocytus trypetae* described here is similar to certain of the Pteromalids (e.g. *Spalangia*) described by Parker, and his descriptions of *Torymus* spp. agree with mine of *T. cyanimus*, while *Eurytoma dentata* and *E. rosae* are, according to Parker, very like *Eurytoma robusta*; but *Eurytoma curta* in its early stages is peculiar and does not fit into any of Parker's seven larval groups.

The descriptions published here are similar in scope to those of H. L. Parker, and particular stress has been laid on those characters which were found to be useful in the recognition of these species from each other; the internal anatomy has not been studied. In addition to the structure of the head and the nature of the integument and its armature of setae and spines, the structure of the spiracles has been found to provide characters useful in the recognition of species, as was found by Thorpe (1930) for the Ichneumonidae, and these have been examined in some detail. Careful study with a 1/12 oil immersion lens shows that the funnel-shaped opening of a spiracle is obstructed by a series of transparent baffle plates each of which has a circular hole in its centre, so that the actual aperture of the spiracle is not as large as used to be thought.

In this paper it will be sufficient to give only the briefest account of the life-

histories of these parasites, since these will be dealt with exhaustively in a paper which is at present being prepared for publication.

Eurytoma curta Walker.

Life-history.—The adult parasite emerges in July and August and seeks its hosts in the flowerheads of the black knapweed, *Centaurea nigra* L. (Compositae). The host is the larva of the common Trypetid fly *Euribia jaceana* Hering (known until recently as *Urophora solstitialis* L.), the larva of which forms galls in the flowerheads (see Wadsworth, 1914, and Varley (paper in preparation)). The parasite lays its eggs in the very small host larvae, and it is rare that more than one egg is found in a host. The host continues to feed, and becomes

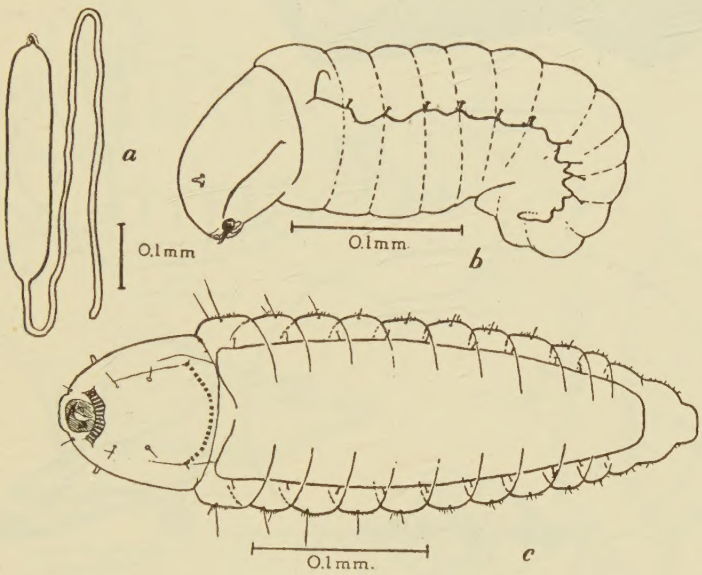

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FIG. 1.—*Eurytoma curta* Walker. *a.* egg, *b.* first stage larva, lateral aspect, *c.* first stage larva, ventral aspect.

fully grown at about the normal time in late August or September, but then behaves differently from a healthy host, and immediately forms its puparium and prepares for pupation instead of passing the winter in the larval stage. The parasite then grows very rapidly and consumes its host completely within a few days, and spends the winter in the otherwise empty puparium. This case of accelerated development due to parasitism has, with others, been discussed in a separate paper (Varley and Butler, 1933). Pupation of the parasite follows in the early summer.

The egg (fig. 1, *a*) is colourless and cylindrical, 0·4 mm. long and 0·07 mm. in diameter. It has an elastic "tail" about 1·1 mm. long and 0·01 mm. in diameter. The head of the embryo is directed towards the "tail" of the egg.

The first instar larva (fig. 1, *b*, *c*). When newly hatched is about 0·38 mm. long and 0·10 mm. broad, tapering considerably at each end. Colour white and shining. It consists of a head and 13 body segments. The integument has bands of very minute spines, scarcely discernible with a $\frac{1}{12}$ oil immersion lens, and on each segment are a few fine setae.

The head is completely sclerotised but is not pigmented, except for the mandibles and the " pharyngeal bracon." The latter is a pair of deep invaginations which meet in the middle, dorsal to the mandibles. In fig. 1, *c* the pharyngeal bracon is heavily cross

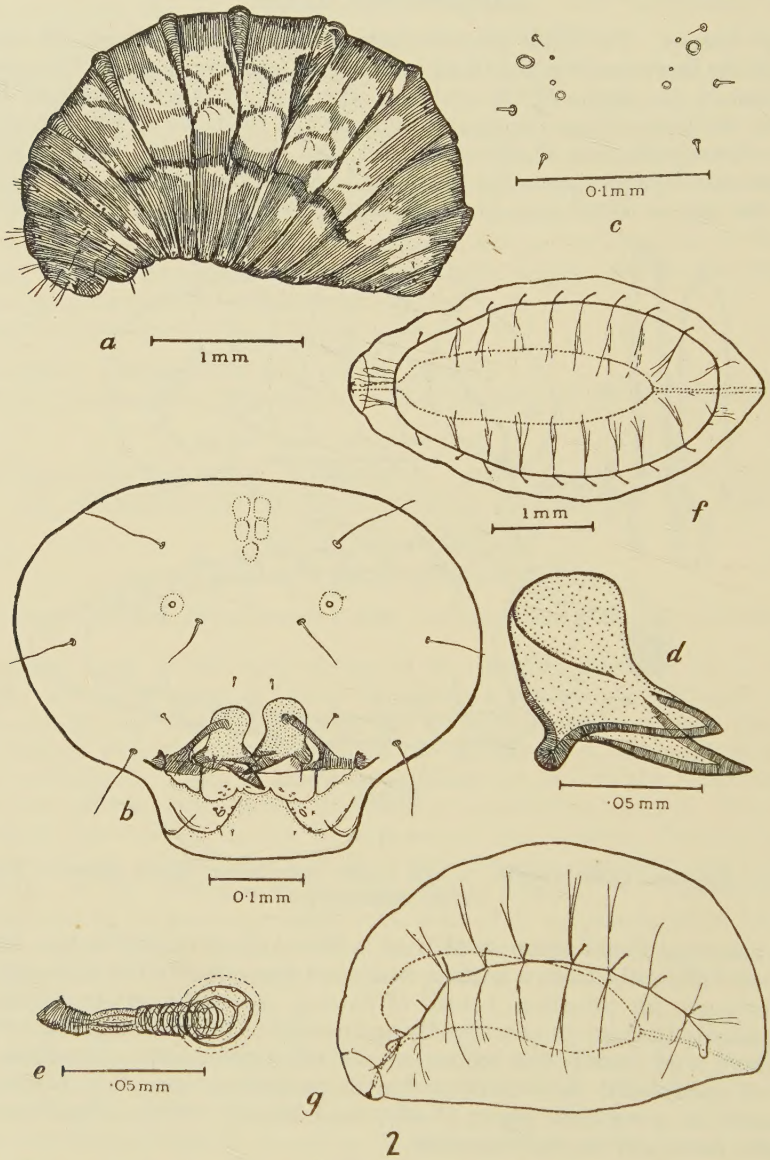

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Fig. 2.—*Eurytoma curta* Walker. *a*. last instar larva, *b*. head of last instar larva, *c*. details of sense organs on the labium and maxilla, *d*. mandible of last instar larva, *e*. spiracle of last instar larva, *f*. tracheal system, ventral aspect, *g*. tracheal system, lateral aspect.

hatched. From the ends of the pharyngeal bracon an indistinct hypostomal suture leads back to the posterior tentorial pits. The tentorium is a slender curved strut (dotted in fig. 1, *c*). The mandibles are about 0·02 mm. long, each with a single curved tooth.

The tracheal system is peripneustic with 10 pairs of open spiracles which open on the anterior border of segments 2–11.

There are already a number of species of *Eurytoma* whose larvae have been described, but these, e.g. *E. dentata* (Parker, 1924), *E. fellis* (Noble, 1936) and *E. parva* (Phillips, 1927) are ectophagous species, whose first instar larvae belong

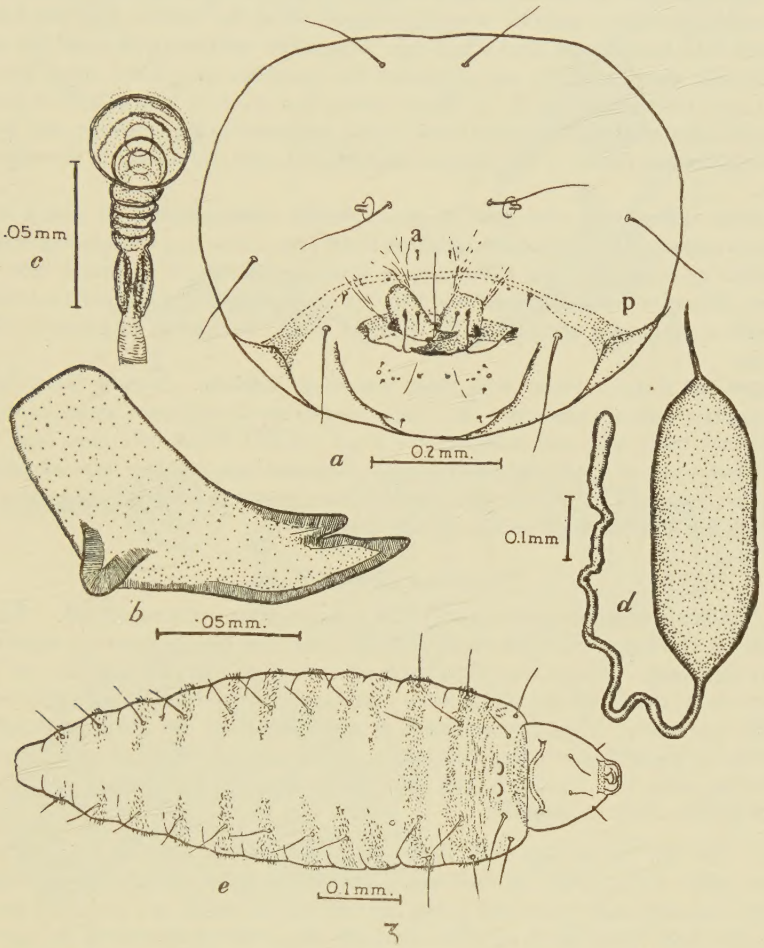

FIG. 3.—*Eurytoma robusta* Mayr. *a*. head of last instar larva, *b*. mandible of last instar larva, *c*. spiracle of last instar larva, *d*. egg, *e*. first instar larva, ventral aspect.

to Parker's group VI (though in *E. fellis* there are apparently no spiracles till the third instar), as does *E. robusta* described below. *E. curta* differs from these in its peripneustic tracheal system, and in the slighter sclerotisation of the head, and in the great reduction of the spines and bristles on the integument.

Last larval instar (fig. 2, *a*). Nearly twice as long as broad, blunt anteriorly, somewhat pointed posteriorly, with the widest part behind the middle. Length between 1·5 and 3·0 mm. White, shining.

Head (fig. 2, *b*) hemispherical, about 0·5 mm. across, well sclerotised except for the region ventral to the mandibles; antennae represented by cones 0·02 mm. across surmounted by brown knobs 0·006 mm. in diameter: mandibles 0·1 mm. long (fig. 2, *d*), heavily sclerotised, bidentate, articulating ventrally with the pharyngeal bracon, dorsally with the narrow pleurostoma; labrum transparent, separated from the clypeus by an indistinct suture which ends at the invaginations of the pharyngeal bracon, its free border deeply cleft into three and each division crenate; a group of five sensoria lies at each side of the middle division: maxillae scarcely separated from the labium, together forming a prominent lobe beneath the head which can be partially retracted; on each side are two large disc-like sensoria which may represent the maxillary and labial palpi, two small sensoria, and three spines (fig. 2, *c*). Head bearing four pairs of long hairs, one lateral to the posterior tentorial pit, the others dorsal, ectal, and mesal to the antennae, and two pairs of short spines, one dorsal of the posterior tentorial pit, and one mesal, on the edge of the clypeus.

Tracheal system with nine pairs of open spiracles on segments 2–10, and a vestigial spiracle on segment 11. Spiracular apertures 0·008 mm. across in a transparent membrane surrounded by a sclerotic ring 0·025 mm. in diameter, leading to a conical tube, length 0·05 mm., diameter decreasing from 0·015 to 0·01 mm., which is supported by about nine rings with a perforated septum at the level of each. End piece of spiracle 0·012 by 0·008 mm.

Integument shiny, smooth, with small transverse wrinkles. Narrow dorsal folds lie at the anterior edge of segments 4–10. Setae present on all segments, those on segments one and two being long and hair-like, 0·1 mm., the rest about 0·04 mm. long. Each segment has a pair of dorsal and ventral setae; segments one and two have an additional dorsal pair; segments 1–3 have a ventrolateral pair; segments 1–4 and 8–13 have a lateral pair which lies posteroventral to the spiracle, if present.

Eurytoma robusta Mayr.

In contrast with *Eurytoma curta*, this species is an ectoparasitoid. The eggs are laid on the large host larvae in August, and the larvae feed up rapidly and destroy the host. They then turn their attention to the gall and bite off lumps of tissue from this, and the chips are a constant feature of the gall cells containing this parasite. This behaviour * is also recorded by Phillips (1927) for *E. parva*, in whose paper other references and a general discussion will be found. The larvae pass the winter in the gall and pupate the following summer and emerge in late July or August.

Egg. The egg (fig. 3, *d*) is dark brown in colour, and cylindrical, 0·6 mm. long by 0·17 mm. wide, with a "tail" at each end. At the micropylar end is a slender outgrowth 0·12 mm. long and at the other end a long tail 0·02 mm. in width and about 0·8 mm. long.

The first instar larva (fig. 3, *e*) differs markedly from that of *E. curta* in its more spiny integument. The spines are well developed on the thorax and form complete bands, while on the abdomen they are confined to bands which are ventrally incomplete.

The head is very like that of *E. curta* except that the setae are longer. The tracheal system is open, with spiracles on segments 2, 4, 5 and 6. The larva fits well with Parker's larval Group VI, and closely resembles *E. parva* as described by Phillips (1927).

5th instar larva. Resembles *E. curta* much more closely than in the first instar. The mandibles (fig. 3, *b*) are much larger, and the main mandibular tooth is more slender and

* The larvae of *E. aciculata* and *E. phanacidis* also share this habit. They have been found by me parasitising the Gall-wasp *Phanacis centaureae* in the stems of the great and the black knapweeds (*Centaurea scabiosa* and *C. nigra*).

curved. The antennae (fig. 3, *a*) are short cylinders, 0·01 mm. long and 0·008 mm. broad. The long setae by the antennae are in a straight line, instead of being mesal and ventral to the antennae.

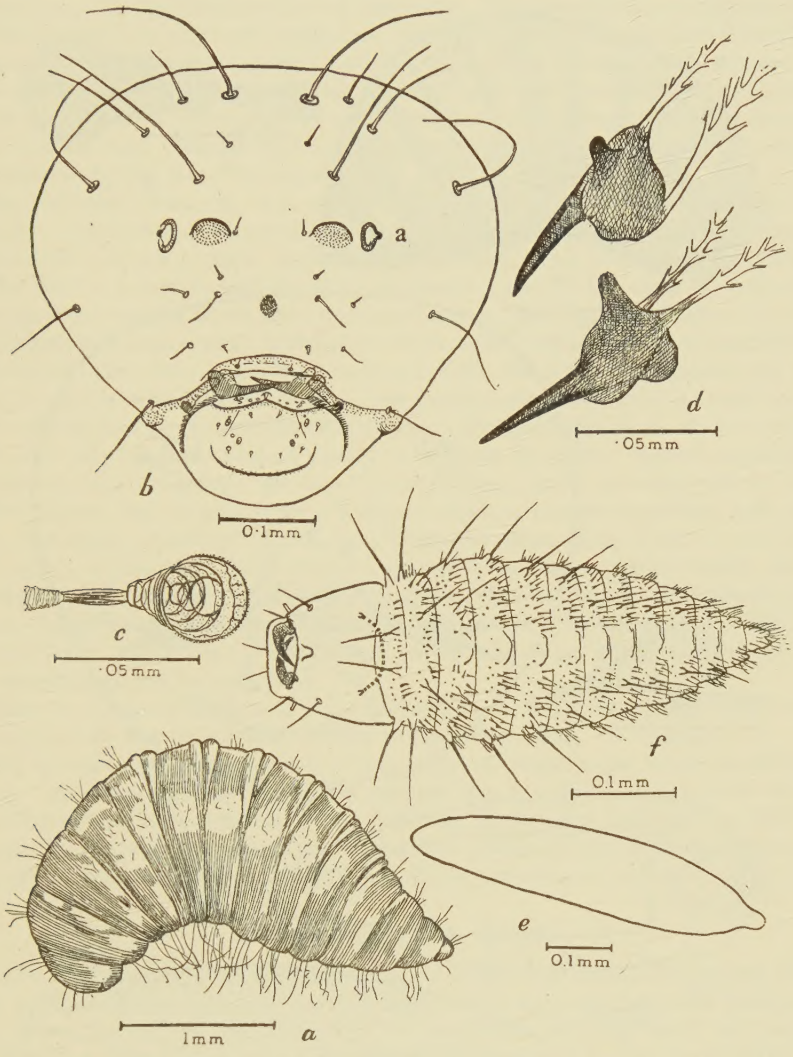

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FIG. 4.—*Torymus cyanimus* Boh. *a*. last instar larva, *b*. head of last instar larva, *c*. spiracle of last instar larva, *d*. mandible of last instar larva, *e*. egg, *f*. first instar larva, ventral aspect.

The spiracles (fig. 3, *c*) are larger than *E. curta*, having an external diameter of 0·03 mm. and a length of 0·064 mm. with an end piece 0·02 × 0·014 mm.

Torymus cyanimus Boh.

This species is a common ectoparasitoid of *Euribia jaceana* and attacks the fully grown larvae in August. Some few adults emerge from this generation

in September, but the majority pass the winter in the larval stage and emerge in late May of the following year. At this period they certainly do not appear

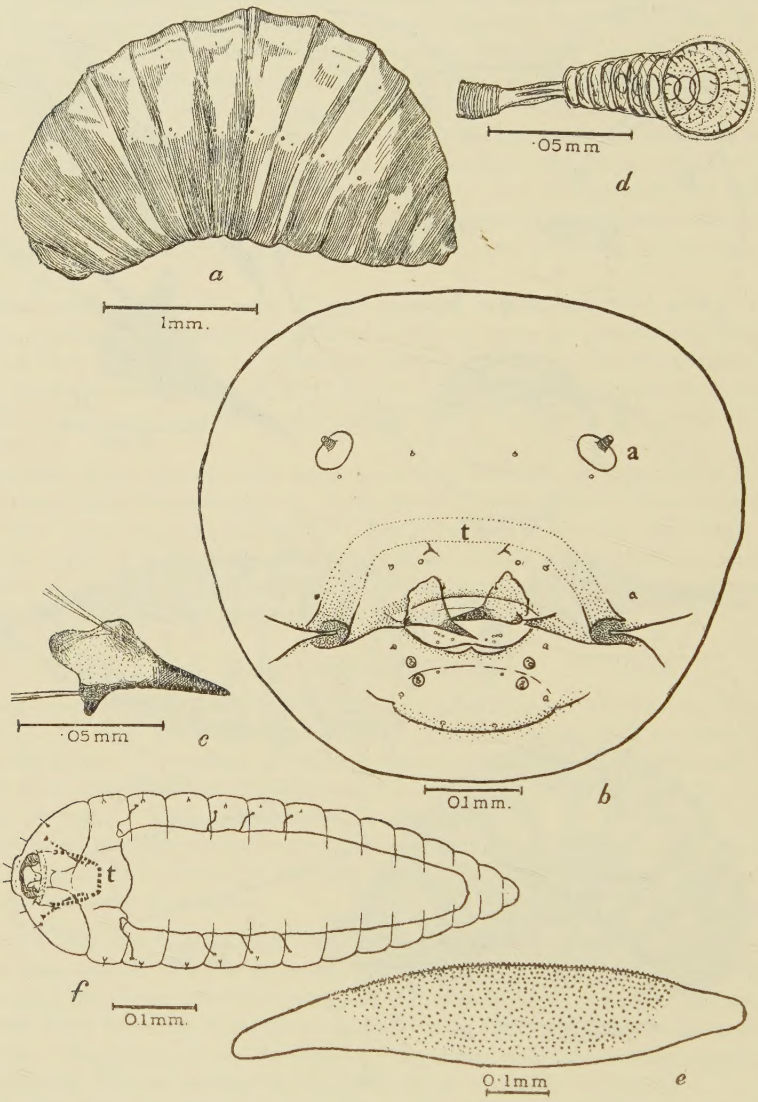

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Fig. 5.—*Habrocytus trypetae* Thoms. *a*. last instar larva, *b*. head of the last instar larva, *c*. mandible of last instar larva, *d*. spiracle of last instar larva, *e*. egg, *f*. first stage larva.

to attack the remaining larvae of *Euribia jaceana*, but whether they wait till the next August in the adult stage or pass another generation on another host has not been determined.

The egg (fig. 4, *e*) is 0·6 mm. long and 0·12 mm. in diameter, white, shining and quite smooth.

The first instar larva (fig. 4, *f*) belongs to Parker's group VI. It consists of a head and 13 segments. The head has four pairs of long setae. The mandibles are strong and curved, and the antennae are short and cylindrical. The tentorium is a simple curved bar (dotted in figure *f*). The thoracic segments each have three pairs of setae nearly 0·1 mm. long, which are lateral, laterodorsal and lateroventral. On the abdominal segments the lateroventral pair is absent. Each segment of the body has a girdle of spines which is incomplete on the ventral side. The tracheal system opens by spiracles on segments 2, 4, 5 and 6 and is essentially like that of *H. trypetae* in fig. 5, *f*.

The last larval instar, fig. 4, *a*, is about 2½ times as long as broad, strongly flexed ventrally; blunt anteriorly, posteriorly tapering to a sharp point, which is rather upturned. Length from 1–3½ mm.; white, shining, hairy; consisting of a head and 13 segments.

The head is hemispherical (fig. 4, *b*); antennae a pair of low cones (*a*) 0·03 mm. in diameter with a central brown knob 0·006 mm. across; between the antennae lie two low prominences 0·04 mm. across; in the centre of the face is a raised brown thickening of the integument; above the mandibles a thickened ridge, the epistoma, separates the transverse, notched labrum from the clypeus; just dorsal to the labral strut is a small invagination which is possibly the anterior tentorial pit. The mandibles (fig. 4, *d*) are narrow and acute, 0·07 mm. long, and expand basally to 0·04 mm. in width. Region ventral to the pleurostoma soft, comprising the maxilla and labium, which are separated by a very shallow groove; the maxilla bears a θ-shaped organ, a circular sensorium, and a small spine; the labium is divided into two by a transverse suture above which is a row of four small spines, a pair of θ-shaped organs, a pair of spines and a pair of circular sensoria. The head bears in addition seven pairs of long setae, six near the edge of the head capsule, and one dorsal to the antennae; six pairs of short setae lie either side of the middle of the face, and a pair on the edge of the clypeus; on the edge of the labrum are two groups of four sensoria and two separate pairs.

Body integument shining, with slight transverse furrows; each segment with a central row of about 40 long setae, rather shorter on the ventral side.

The spiracles open on segments 2–10 into a pair of lateral trunks connected at the two ends by transverse tracheae; spiracular aperture (fig. 4, *c*) 0·01 mm. across in a transparent membrane surrounded by a ring 0·03 mm. in diameter, leading to a short cone 0·04 mm. long supported by about nine rings with a perforated septum at the level of each; end piece of spiracle 0·025 mm. by 0·006 mm. slightly tapering at each end.

Habrocytus trypetae Thoms.

This species is also an ectoparasitoid of *Euribia jaceana*, and passes two or three generations in the year on this host. The eggs are laid as a rule on the fully grown larvae of the host, but it sometimes happens that the parasite emerges at a time of the year when few or no hosts are in the larval stage, and it consequently suffers catastrophic reductions in population density; for this reason it is not very efficient in controlling the numbers of the host.

Habrocytus trypetae is not very particular in its choice of hosts in the galls of *Euribia jaceana* and may attack the larvae of *Eurytoma curta*, and other parasites too if it encounters them.

The egg (fig. 5, *e*) is 0·8 mm. long, fusiform with rounded ends, white and shining, with part of the surface covered with small rounded papillae.

The first instar larva (fig. 5, *f*) is typical of the ectophagous Pteromalidae, and belongs to Parker's larval group II. It consists of a head and 13 segments. The head bears a few short bristles; the mandibles are small and curved, and articulate with the pharyngeal

bracon, a transverse strut within the head. The tentorium (*t*) shown dotted in fig. 5, *f* has a long loop extending backwards, and a slender pair of anterior arms leading to the dorsal side of the head near the rudimentary antennae.

The tracheal system opens by spiracles on segments 2, 4, 5 and 6, and there are small spines on segments 1 to 6 which lie close by the spiracles.

The last larval instar (fig. 5, *a*) is twice as long as broad, anteriorly rounded, posteriorly rather pointed; length about 3 mm.; white, shining; consisting of a head and 13 segments.

The head (fig. 5, *b*) is hemispherical, bearing a pair of antennae, each of which is a brown conical peg, 0·025 mm. long on a raised circular area 0·05 mm. across, a small circular sensillus lies beneath each antenna, and a pair of short setae lie between them; two slightly raised areas dorsal to the mandibles bear what may be the anterior tentorial pits, lateral to which is a pair of sensoria, and a pair of small spines. The clypeus is separated from the labrum by a curved suture, and bears a pair of spines. The emarginate labrum has a group of five sensoria on each side. The mandibles (fig. 5, *c*) are acute, 0·08 mm. long, 0·05 mm. broad basally; they resemble the mandibles of *Eupteromalus nidulans* (Proper, 1931). They articulate ventrally with the mandibular struts, which are 0·8 mm. long and end in the dark brown posterior tentorial pit, from which the strong tentorial ring extends inwards; above the pit is a small spine. The convex area beneath the mandibles is crossed by a curved furrow which possibly separates the submentum from the mentum; just above it, on the mentum are two pairs of spines; a very faint suture runs transversely and may separate the maxilla from the labium; the main organ on each is similar and is a small protuberance with a large and a small sensorium at its apex; the maxilla has in addition a spine, and the labium a circular sensorium and a spine.

Body integument shining with slight transverse furrows; each segment with a dorsolateral and a lateral pair of spines, the latter close to the spiracle; a minute pair of ventral spines is borne by segments 1–3 and 12 and 13.

Spiracles on segments 2–10 and a vestigial spiracle on 11, connecting to lateral tracheal trunks which are joined both anteriorly and posteriorly by transverse trunks; each spiracular aperture 0·01 mm. across in a transparent membrane surrounded by a circular wall 0·03 mm. in diameter; a conical tube 0·05 mm. long leads inwards, supported by about nine rings, the last being 0·013 mm. across, with a perforate septum at the level of each; end piece of spiracle 0·02 mm. long by 0·006 mm. wide.

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THYSANOPTEROLOGICA *

Von Dr. H. Priesner.

Communicated by Dr. S. A. Neave, O.B.E., F.R.E.S.

1. Zwei neue Phlaeothripiden aus Uganda, gesammelt von Mr. H. Hargreaves.

Hoplandrothrips ugandensis sp. n.

Diese Art ist dem *H. schoutedeni* Priesner vom Belgischen Kongo so äusserst ähnlich, dass ich sie mit ihr identisch gehalten hätte, wäre ich nicht im Besitze einer Serie beider Arten gewesen. Eine genauere Beschreibung erübrigt sich völlig, und es ist möglich, dass es sich um eine von *H. schoutedeni* scharf geschiedene Rasse handelt; die Unterschiede sind in grosser Serie konstant.

Das ♂ ist von dem des *H. schoutedeni* durch den Besitz eines stumpfen, zahnartigen Vorsprungs am äussersten Ende der Vordertibie, der bei starken ♂♂ kräftiger ist als bei schwächeren, verschieden; bei *schoutedeni* ist ein solcher Zahn niemals, auch bei den kräftigsten Exemplaren nicht, angedeutet; das Zähnchen im basalen Drittel der Vordertibie, bei *schoutedeni* fast immer gut entwickelt, ist bei *ugandensis* meist nur als schwaches, an einer Querleiste sitzendes Höckerchen ausgebildet; Schenkelzähne bei beiden Arten gleich entwickelt. Im weiblichen Geschlechte sind die beiden Formen schwieriger zu unterscheiden, aber sie sind gleichfalls, wie es scheint, konstant verschieden: Die Poren und Microsetae in der Mitte der mittleren Tergite des Abdomens sind bei *ugandensis* einander viel mehr genähert als bei *schoutedeni*; am 3. Tergit z.B., sind die Innenränder der borstenlosen Poren bei *ugandensis* 21–33 μ voneinander entfernt, während sie bei *schoutedeni* 38–48 μ voneinander abstehen.

Bei der Beschreibung des *H. schoutedeni* (1932, *Rev. Zool. Bot. Afr.*, **22** : 206) gab ich an, dass die 3. Flügelbasalborste beim ♂ spitzig sei; dies ist zwar richtig, aber nicht immer der Fall; so kann auch bei *ugandensis* diese Borste bisweilen geknöpft, oder nur auf der einen Körperseite so sein, auf der anderen spitzig.

Masze der Holotype (♂) in μ: Kopflänge 216 (mit Fortsatz 240), Breite an den Augen 180, hinter den Augen 188; hinterster der 3–4 Kopfstacheln 28; Postokularborsten 108–112; Augenlänge (lateral) 80–86; Fühlerlänge 433–442; Gliederlängen (-breiten): 32–36 (B. 65, Sp. 48), 52–56 (48), 64–66 (62), 76 (56), 66 (46), 64 (39), 52 (35), 36 (20); Sinneskegel 3. und am 4. Gl. 30–32; Pronotumlänge 180, Breite ohne Coxen 337, mit diesen 433; Vorderecken-Borsten 116–120, laterale 72–76, äussere Hinterecken-Borsten 92; Pterothorax (vorn am breitesten, nach hinten verengt) 424; Flügelbasalborsten 60–64, 76–80, 76–80 lang; Zahl d. Schaltwimpern 9–14; Borsten am 9. Segment, B. 1: 144, B. 2 (dornartig): 65, B. 3 haarartig, 180; Länge d. 9. Segmentes 100–105; Tubuslänge (dorsal) 156 -(lateral) 160, Basalbreite 80–82, Endbreite 36; Laterale Terminalborsten d. Tubus 140–145.

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* Vergl. 'Thysanopterologica' I, 1925, *Zool. Jahrb.* (*Syst.*), **50** : 305–319; II., 1926, *ibidem*, **52** : 267–278; III., 1928, *ibidem*, **56** : 43–66.

Masze der Allotype (♀) in μ: Kopflänge 220–225, mit Fortsatz 248, Breite an den Augen 196, hinter d. Augen 206; hinterstes der 2–4 Stachelpaare 16–18; Postokularborsten 96–100; laterale Augenlänge 92–94; Fühlerlänge 458–467; Gliederlängen(-breiten): 36 (B. 45, Sp. 36), 52 (35), 70–72 (45), 76–78 (43), 68 (34), 64 (29), 56 (27), 34 (13); Sinneskegel am 3. und 4. Glied 34–35 lang; Pronotumlänge 172, Breite ohne Coxen 337, mit Coxen 407; Vordereckenborste 68, äussere Hintereckeborste 80–84, innere 96; Pterothoraxbreite 415; Flügelbasalborsten 60–65, 72, 80; Zahl d. Schaltwimpern 8–12; Borsten am 9. Segment, B. 1: 140–144, B. 2: 144; Länge des 9. Segmentes 104, Tubuslänge (dorsal) 160-(lateral) 168, Basalbreite 88–92, Endbreite 40; Analborsten (laterale) 152–160.

Uganda: Entebbe, 16.v.1935, Blattroller an *Morinda lurida.*—Gesammelt von *H. Hargreaves.*—Typen im British Museum.

Cercothrips modestus sp. n.

♀: Braun bis schwärzlich, rotes Pigment im Körper sehr dicht gelagert und reichlich. Die starren, kurzen Borsten an den Schenkeln, den Vordercoxen, der Flügelbasis, den Seiten des Abdomens sind schwärzlich; beide Flügel schwach gelblichgrau getrübt, nur bei dunklen Exemplaren mit einem unbestimmten Längswisch, *kein* deutlich definierter Längsstreif vorhanden; an den Fühlern ist das 2. Glied am Ende aufgehellt, das 3. weisslichgelb, etwa im Endviertel getrübt, das 4. und 5. etwa in der basalen Hälfte (oder weniger) hell; bei dunklen Stücken ist aber auch die äusserste Basis schmal ringartig getrübt, das 6. Glied noch hinter der Basis aufgehellt, bei den meisten (lichteren) Exemplaren ist das 4. Glied in mehr als der basalen Hälfte weisslichgelb und noch die zwei Grunddrittel des 6. Gliedes sind gelb (nur ein schmaler Basalring dunkel); bei unausgefärbten Stücken sind diese Trübungen lichtgrau, so auch das 7. und 8. Glied lichtgrau. Beine einfarbig dunkel.

Kopf von den Augen an 433 (total 467) μ lang, die Augen etwas vorgewölbt, hinter ihnen ist der Kopf geschnürt, dann nach hinten wieder etwas erweitert, an den Augen 258, hinten 277–287 μ breit; Augenlänge 132 μ; Ocellenhöcker *sehr* schwach entwickelt; Mundkegel sehr breit gerundet; Kopfseiten mit sehr feinen schwärzlichen Stachelchen spärlich besetzt, 2 Paar dorsale müssen als Postokularborsten aufgefasst werden, sie sind kurz und am Ende Stumpf, 40–45 μ lang, die vorderen an die Seiten gerückt und stehen vom Hinterrande der Augen (bei der Holotype) 88–92, von einander 172 μ ab, die Borsten des hinteren Paares sind einander sehr nahe, 28–36 μ und ist vom vorderen Paar etwa 52 μ entfernt, in manchen Fällen stehen aber die hinteren PB. weiter nach vorn und zueinander nicht in gleicher Höhe. Fühlerlänge 1·038–1·055 mm.; Gliederlängen (-breiten) der Holotype: 72–76 (56), 80 (46), 208 (40), 144 (40–42), 144 (42), 116 (40), 84 (32), 60–64 (22) μ; das grösste vorliegende Stück vom 3. Gl. an: 224 (42), 160 (43), 148 (42), 116–120 (43–44), 84 (32), 60 (24) μ; das 1. Glied etwas gekrümmt, innen konkav, aussen konvex, die zwei Dorsalborsten des 2. Gliedes am Ende nicht ganz scharf, das 3. Glied etwas unregelmässig, hinter der Mitte etwas verdickt, aber nicht so deutlich wie bei *C. afer*, mit 1 kurzen Sinneskegel, das 4. mit 1 + 2, 5. und 6. mit 1 + 1, 7. mit 1d; das 8. Fühlerglied lang-kegelig, mit dem 7. ein Ganzes bildend. Pronotum etwa 240 μ lang, ohne Coxen 450–470 μ breit, vorn ausgerandet, oben querwellig; die Borsten am Vorderrand und den Vorderecken schwach, viel schwächer als bei allen *Cercothrips*-Arten (inkl. (*Gig.*) *tibialis* Bagn.), das stumpfe Vordereckenbörstchen höchstens 40–45 μ lang, die innere Vorderrandborste 32–36 μ; ausser diesen sind in der Gegend der Vorderecken nur wenige Börstchen vorhanden (bei *Gigantothrips elegans* sehr viele, auch am Vorderrande innen); die äusseren Hintereckenborsten starr, dunkel, am Ende abgerundet, 112–120, die inneren viel kürzer (etwa 40 μ); Vorderschenkel aussen, wie bei anderen Arten mit dunklem Stachelpaar, ein Coxen-Stachel 60–65 μ lang, ebenfalls dunkel, mit heller Spitze, stumpf; Vordertarsen ausser der Kralle mit einem schräg nach vorn gerichteten, scharfen, etwas gebogenen

Zähnchen. Pterothoraxbreite 675–745 μ; Flügel etwa 1·765 mm. lang, vor dem Beginne der Schaltwimpern gemessen 192 μ breit; die 3 Basalborsten starr, dunkel, weiss-geknöpft, bei der Type 64, 56 und 52 μ lang, die beiden ersten einander genähert, 40–60 μ, das 2. vom 3. 96–104 μ entfernt; Schaltwimpern wenig dicht, 14–20 an der Zahl, gewöhnlich 17–19. Borsten am Abdomen dunkel, am Ende hell, dick, abgerundet, sie messen am 8. Segment, lateral, 116 μ; am 9. Segment sind drei Paare dicker Borsten vorhanden, die 120–132 μ lang sind; 9. Segment etwa 200 μ lang, 286 μ breit; Tubus 615 μ lang (570–640), am Grunde 128, am Ende 74 μ breit; Analborsten kurz, etwa 160 μ, die Spitzen schmal lanzettförmig. Auf den vorderen Tergiten sind vom 2. an seitlich ausser den Sperr-Dornen, auf schwach quergenetztem Grunde, 5–7 schräg nach innen gerichtete Lateralborsten vorhanden, an den Hinterecken 1 dicke Borste, gleich daneben eine ventrale.

♂: Dem ♀ sehr ähnlich, kleiner, das Zähnchen der Vordertarsen nicht oder kaum grösser, aber mehr senkrecht abstehend und oft stärker gekrümmt, hakenartig, das 9. Segment anders beborstet: Während sich da beim Weibchen sechs ungefähr gleichlange starre, dunkle Borsten befinden, von denen auch das ventrale Paar stumpf ist, sind beim ♂ 2 ungleich lange dorsale Paare stumpfer Borsten und 2 haarartige, ventrale vorhanden; B. 1 etwa 120, B. 2 nur 56–60 μ, B. 3 (lateral) 72–100, B. 4 (ventral) 105 μ, doch dürften die beiden letzteren (Spitzborsten) grösseren Variationen unterworfen sein. Schaltwimpern 14–23.—Masze der Allotype (♂) in μ: Kopflänge 398 (total 433), Kopfbreite an den Augen 252, hinten 272; Augenlänge 124–138; hintere Postokularborsten 36–48 μ; Fühler vom 3. Gliede an: 188–196 (34), 130 (38), 124 (38), 102 (35), 76–78 (28), 52 (21); Hintereckenborsten am Pronotum 76–80, Coxenborste 40; Tubus 510 lang, am Grunde 120, am Ende 66 breit; Analborsten 140–150.

Larve.

II. Stadium: Tief rot, Pigmentzellen den ganzen Körper dicht erfüllend, an den Beinen in die Tibien eindringend, bisweilen bis zur Mitte derselben. Dunkel chitinisiert sind: Die Beine, 1. und 2. Fühlerglied, das letztere mit Ausnahme des üblichen weisslichen Dorsalflecks, die Kopf- und vollständigen Pronotum-Platten, die kleinen Borsten-Basal-Plättchen, Seitenplatten des 8. Segmentes (B. 1 von der Seitenplatte getrennt), das 9.–11. Segment. *Körperborsten stark getrübt.* An den Fühlern das 3. Glied weissgelb, sein Enddrittel (oder etwas weniger) getrübt, 4. getrübt, doch *hinter* der Basis etwas aufgehellt, ähnlich wie bei der Imago, die folgenden Glieder dunkel.

Fühlergrubendistanz 64–67; Kopfbreite an den Augen 192–196 μ, Körperborsten dick, dunkel, am Ende plötzlich hell, abgerundet oder schwach geknöpft; Inneraugenborste 40–44, B. 1 der 2. Reihe 52–56, B. 2: 32 μ; Kopfkutikula glatt; Fühlerlänge 570–606 μ; Gliederlängen (-breiten): 40, 72–76 (44), 216–232 (36), 120–124 (37), 76 (36), 34 (25), 24 (14–15) μ; 3. Glied am Grunde nicht deutlich erweitert, etwas geschnürt, der ganzen Länge nach nicht ganz regelmässig, am Ende keulig verdickt, wie das 4. mit zartem, geradem Sinneskegel (18–20 μ); 5., 6. und 7. Glied von einander nicht so scharf getrennt als gewöhnlich, doch sind die Nähte ringsum erkennbar. B. 1 des Pronotums 40–45, B. 2 dünner und kleiner, etwa 28, B. 3: 60, B. 4: 64–68, B. 5: 52–56, B. 6: 80, B. 7: 56–58 μ; Dicke von B. 6 etwa 4 μ; B. 3 des Mesonotums 56–60, B. 6: 68–72; B. 6 des Metanotums etwa 80 μ lang; B. 1, 2 des 1. Abdominalsegmentes 76, B. 2, 3 des 7. Segmentes 88–100, B. 2, 3 des 8. Segmentes 72–80, B. 1 des 9. Segmentes 120–126, B. 2: 116–122, B. 3: 124–136 μ; diese Borsten sind dick, dunkel, hell-geknöpft, B. 4 ebenso, doch nicht genau messbar. 9. Segment 200–214 μ lang, am Grunde 156–168, am Ende 132–136 μ breit; 10. Segment 172–176 μ lang, am Grunde 100–105, am Ende 36–53 μ breit. Analborsten kurz, schmal-oval geknöpft.

Auch die Puppen und Vorpuppen sind tief rot.

Uganda: Kampala, 5.xi.1931, auf den Blättern eines undeterminierten

buschigen Baumes, wird von einer Capside (rote Larven und schwarze Imagines) befallen (*H. Hargreaves*, No. D. 287).—Typen im British Museum.

Die neue Art scheint von den bisher beschriebenen durch den kurzen Tubus und Kopf und die kräftigen Fühler stark verschieden zu sein; sie steht aber den afrikanischen *Cercothrips*-Arten noch immer viel näher als den echten *Gigantothrips*-Arten, so dass ich sie bei *Cercothrips* einreihte und nicht bei letzterer Gattung.

Als Hood (1919, *Ins. Insc. Menstr.*, **7** : 73) die Gattung *Cercothrips* aufstellte, auf Grund der Art *Idolothrips nigrodentatus* Karny, wies er schon darauf hin, dass diese Gattung der Gattung *Gigantothrips* sehr nahe stehe; ohne Zweifel sind fast alle die gegenüber *Gigantothrips* angegebenen und tatsächlich vorhandenen Unterschiede nur graduelle; der bei *G. elegans* und *G. crawfordi* kegelförmig vorgezogene Ocellenhöcker, die etwas weniger deutliche Längsader der Hinterflügel, die (beim Männchen) nicht so lang wie bei *C. nigrodentatus* ausgezogenen mittleren Abdominalsegmente. Nach Hood hat das Weibchen des *C. nigrodentatus* kein Tarsenzähnchen, was mit den mir vorliegenden Exemplaren nicht übereinstimmt, bei denen das Zähnchen immer vorhanden, aber bisweilen klein und in gewisser Lage nicht zu sehen ist. Als zu *Gigantothrips* gehörig wurden eine Reihe weiterer Arten beschrieben (ausser *G. elegans* Zimm. und *G. crawfordi* Hood), die aber, soweit sie mir bekannt wurden, viel eher zu *Cercothrips* als zu *Gigantothrips* zu stellen wären, so z.B. *G. tibialis* Bagn., *G. nigripes* Ka. und *G. niger* (Mlt.) (als *Idolothrips* beschrieben). Ich möchte hier darauf hinweisen, dass bei *C. afer*, *tibialis* und *nigripes* (die ich in Originalpräparaten vor mir habe), an der Aussenseite der Schenkel, sowie an den Seiten des Abdomens (9. Segm.) dicke, stumpfe Borsten vorhanden sind, ebenso hat bei diesen Arten das Pronotum vorn 1–2 starre Borsten (die letzteren bei *C. modestus* am schwächsten entwickelt); diese Borsten fehlen bei *G. elegans*, *crawfordi*, *gracilis* Bgn. und *venapennis* Mlt.; es sind hier wenigstens am 9. Segment dünne Spitzborsten vorhanden; ein anderes, für die vier erwähnten *Gigantothrips*-Arten charakteristisches Merkmal, das bei den anderen oben erwähnten *Cercothrips*-Formen (einschliesslich *C. nigrodentatus*) nicht vorkommt, ist die Beborstung des Vorderrandes des Pronotums; der Vorderrand trägt eine mehr weniger dichte Reihe von mehr weniger kleinen, nach innen gerichteten Börstchen, die sich an den Vorderecken zu einer Gruppe verdichten. Diese beiden Merkmale mögen weiterhin zur Unterscheidung von *Gigantothrips* und *Cercothrips* dienen, vorausgesetzt, dass nicht auch diese Merkmale durch das Auffinden weiterer Zwischenformen wieder wertlos gemacht werden.

2. Ein neuer alpiner *Prosopothrips* aus der Schweiz.

Prosopothrips alpicola sp. n.

Schon durch die Färbung charakterisiert, von *P. vejdovskyi* Uz. aber auch strukturell, speziell durch den Bau der Fühler verschieden.

♀: Körper dunkelbraun, Abdomen gegen das Ende etwas lichter, gestreckte Stücke lassen die Segmenträder gelblich durchscheinen, besonders das 8. Segment an der Basis etwas aufgehellt; auch die Beine dunkelbraun, die Vordertibien innen gegen das Ende *kaum* lichter; 1., 2. und 7. bis 8. Fühlerglied schwärzlichbraun, das 3. bis 5. mehr weniger bräunlich.

Kopfform ähnlich wie bei *vejdovskyi*, Kopf von den Augen an 120 μ lang, hinter den Augen (an der Schläfenerweiterung) 150 μ breit, hinter dieser Erweiterung geschnürt,

Augenlänge 52–54 μ; Kopfoberfläche unregelmässig genetzt. Fühler 240–250 μ lang, wie bei *vejdovskyi*, das 1. Glied quer, aussen stärker gerundet-erweitert als innen, das 2. Glied dicker als bei der eben erwähnten Art, die folgenden Glieder gröber skulptiert, die Querrringel tiefer eingeschnürt als bei *vejdovskyi*-besonders deutlich stufenartig am 4. Glied-, das 7. Glied kürzer. Fühlergliederlängen (-breiten): ? (38), 45 (34), 36 (18), 36–38 (18–19), 36 (34), 57 (18–20), 11 (8), 14 (6) μ. Beine, abgesehen von der ganz verschiedenen Färbung, wie bei *vejdovskyi*; Pronotum etwa 172 μ lang, 236 μ breit, nach vorn verengt, oben mit unregelmässig-welliger Skulptur, ohne deutliche Borsten. Mesothorax 263, Metathorax 310 μ breit, sehr stark quer. 10. Abdominalsegment etwa 96 μ lang, oben der ganzen Länge nach gespalten, unregelmässig längsrunzelig; 9. Segment am Hinterrande mit 3 Paar auf Höckern sitzenden, hyalinen Börstchen, von denen B. 2: 20, B. 3 (lat.): 28–30 μ messen; 9. Segment 152 μ breit; am 8. Tergit liegt zu beiden Seiten der Mitte ein Porus, und zwar *in* der Höhe der vier Paar sehr kleinen Dorsalborsten dieses Segmentes, während bei *vejdovskyi* diese Poren etwas hinter der betreffenden Borstenreihe liegen. Länge der Vordertibien 84 μ.—Gesamtkörperlänge (gedehnt): 1·29 mm.

Schweiz: Wallis, 2300 m., Têtafayaz, 10.vii.1931, *E. Krüger* (A. C. W. Wagner ded., Mus. Nr. 32, 1933), 1 ♀ (Holotype) in coll. Zool. Museum Hamburg.

Es besteht kein Zweifel, dass diese Form eine besondere Art darstellt, wiewohl bisher nur 1 Exemplar vorliegt. Sie ist neben *Anaphothrips secticornis* Tryb. als typisch alpine Art zu betrachten.

SOME EMPIDIDAE (DIPTERA) FROM SYRIA AND ASIA MINOR. PART 1

By J. E. Collin, F.R.E.S.

With Figures 1–4.

Most of the species included in the following paper were sent to me by Dr. Villeneuve de Janti of Rambouillet, and consist of a small collection made by M. Henri Gadeau de Kerville in Syria, and a few species from his own collection, to these I have added one or two in my possession from Asia Minor, and now present the descriptions as a small contribution towards our knowledge of the fauna of this interesting region.

Empis (*Polyblepharis*) *haemorrhoica* Lw. ♂♀.

The male was well described by Loew.

The female is very much like the male except for rather shorter thoracic and distinctly shorter abdominal pubescence, and clearer wings. It has frons and face dull dusted greyish, former with dark hairs in more than one row on each side, latter rather wider than frons with 1–2 small hairs on each side below base of antennae as in male; occiput with more numerous black bristles mixed with pale hairs on upper part behind. Abdomen coloured as in male but the successively narrower apical segments entirely shining black; ovipositor with very short hairs. Middle and hind femora without any spines beneath, but with long

pale pubescence, longer (especially beneath middle femora) than in male; middle tibiae with longer spines beneath, two antero-ventral ones towards tip being especially strong; hairs beneath hind tibiae longer and mainly pale, and two strong antero-ventral black spines on apical half which are absent in male; the pale pubescence between rows of spines above hind tibiae also rather longer than in male.

A pair in the collection of Dr. Villeneuve labelled "Angora IV." thus presumably captured in April, while I possess a male given to me by the Abbé O. Parent, also from Angora taken in May 1912.

Empis (Polyblepharis) angorae sp. n. ♂♀.

Closely resembling *E. haemorrhoica* Lw., with similar dense pale hairs on thorax but primarily distinguished by having legs extensively tawny, and (in female) a pennate postero-ventral fringe to hind femora.

♂. Compared with *haemorrhoica* this species has postocular ciliation on upper part of head, and hairs on ocellar triangle, not so extensively dark. Face without hairs. Thorax grey, practically without stripes; humeral and posthumeral bristles represented by 2–3 black bristly hairs (absent in *haemorrhoica*), five (instead of four) notopleural bristles. Abdomen with a single distinct hindmarginal bristle at each side of 2nd to 5th tergite (absent in *haemorrhoica*). Legs with hind tibiae and base of hind tarsi tawny-yellow, hind and middle femora and middle tibiae dark tawny, while there is some indication of a darker, chestnut-brown, colouring at tip of front femora and on front tibiae. Bristles and hairs very similar in both species, but spines of antero-ventral row on hind femora stronger, and no long pale hairs above hind tibiae; some small differences also in basal segment of front and hind tarsi, notably the presence of more numerous and much finer short hairs behind this segment in the hind tarsi. Wings very pale brownish.

♀. Frontal hairs pale. Face bare. Occipital dark bristles and those on prothoracic collar rather more conspicuous. A few fine dark bristly hairs down lines of dorso-centrals. No abdominal hindmarginal bristles. Legs all tawny-yellow except coxae and basal two-thirds of front femora; tarsi slightly darker apically. Middle femora with a few dark bristly hairs intermixed with the long pale hairs beneath; middle tibiae without the long fine pale hairs of *haemorrhoica*. Hind femora with 4–5 black antero-ventral spines mixed with the scattered long pale hairs; the pennate postero-ventral fringe fading away towards base and tip, but at middle almost as long as femur is deep. Hind tibae with 3 antero-ventral spines towards tip but no long pale hairs either above or below. Wings not clearer than in male. Halteres yellow.

Length about 10 mm.

A pair in Dr. Villeneuve's collection from Angora, taken in April.

Empis (Polyblepharis) damascena (Bezzi *in litt.*) sp. n. ♂♀.

Belonging to the same group as the previous two species, having thoracic disc universally clothed in front with fine hairs, but a smaller narrower species with black legs, four darker stripes on a grey thorax. Hind femora and tibiae of female entirely without fringes. Halteres black.

♂. Eyes as usual practically touching on frons, with upper facets very little larger than lower, the very small frons above antennae, face, and occiput, dull greyish. Occipital hairs numerous, black, and not very bristly on greater part of occiput but those below finer and whitish. Antennae black, first segment not more than 1½ times length of second with rather long dark hairs on outer side and below. Palpi slender, slightly dilated towards tip, greyish-black, clothed with long dark hairs, but actual tip yellowish and bare. Thorax

light bluish-grey, with four brownish stripes, middle pair narrow and abbreviated behind, side stripes broader abbreviated in front. Spiracles whitish. Pubescence usually all whitish, always so on humeri, prothorax and metapleurae, sometimes discal pubescence darker. Bristles black, only one strong prescutellar dorso-central bristle, 2–3 fine humeral and 1 post-humeral bristly hairs, 4 strong notopleural, a supra-alar, postalar and four scutellar bristles. Abdomen shining black, but densely dusted whitish-grey at sides and on venter, more bluish-grey on first tergite, and slightly dusted brownish about middle towards base of tergites 2–5; tergites 6 and 7 with microscopic pile which glistens brownish from some points of view. Sides of abdomen and venter with pale hairs, long on venter and at sides of first 2–3 tergites; tergites 2–5 with a hindmarginal bristle or two at sides, usually black but sometimes pale and then not so conspicuous. Legs rather slender, black; coxae grey, dusted like pleurae, clothed with pale hairs and a few black bristles, rest of legs only very slightly dusted with hind femora especially shining, and all devoid of pale hairs. Front femora almost bare beneath but longer haired behind, without bristles anywhere; middle and hind femora with antero- and postero-ventral rows of short bristles, confined postero-ventrally on hind femora to only 2–3 on basal half; hind femora in addition with 3–4 antero-dorsal bristles towards tip, otherwise both femora quite short-haired. Front tibiae with a few small bristles above, longer-haired behind, and 3–4 apical bristles; middle and hind tibiae with double row of bristles above confined postero-dorsally on middle tibiae to 2–3 on basal half and one at tip; middle tibiae with a few small bristles beneath; hind tibiae with seven apical bristles (1 beneath, 3 in front, a pair above and one behind). Basal segment of front and middle tarsi slender, without bristles above, and only a few spines beneath and round tip; basal segment of hind tarsi stouter with more spines beneath and 3–4 distinct bristles above. Wings clear, all veins (including anal) complete, cubital and discal veins not strongly divergent towards tip, as in two previous species. Halteres with yellowish-brown stem and darkened knob. Squamae yellow.

♀. Resembling male. Frons almost as wide as face, dull greyish with fine dark hairs on each side. Thoracic hairs rather shorter, those on middle part of disc darkened. Spiracles whitish as in male. Abdomen shorter-haired and without bristles, shining black except on first tergite, side margins of other tergites and on venter. Terminal papillae of ovipositor rather longer and more slender than in previous two species and with a long hair at tip. Legs differing chiefly from male in having no short bristles beneath middle femora, and on hind femora only an antero-ventral row of which only the bristles on apical half are at all noticeable. Wings as in male.

Length about 7 mm.

Described from three males and three females, all from Syria, two of the males labelled "Damas." Bezzi who had seen two of these males, associated with them a female of the next species (*syriaca*). If he had seen the three females described above, he would probably have noticed that they agree better with the males in having longer-haired palpi distinctly yellowish toward tip, and whitish thoracic spiracles.

Empis (Polyblepharis) syriaca sp. n. ♀.

Very much like female of *E. damascena*, but hind femora and tibiae with short pennate fringes.

Palpi shorter-haired than in *damascena* and not so noticeably yellow at tip. Bristles beneath first antennal joint rather shorter. Thoracic spiracles brownish-grey. Middle femora with slightly longer and conspicuously denser pubescence antero-dorsally and postero-ventrally. Hind femora much more compressed laterally and with a short dense pennate fringe above and beneath; hind tibiae also compressed and with a pennate fringe

above, even more conspicuous than that beneath femora, in front of this fringe antero-dorsally, a row of short bristles which do not exceed the fringe in length, hind tibiae beneath with a very short inconspicuous fringe among which may sometimes be traced 1–2 small bristles. Basal segment of all tarsi with spines beneath, and of hind tarsi with 3–4 bristles above, much as in *damascena* female.

Length about 7·5 mm.

Two females from Syria; one incorrectly considered by Bezzi to be the female of *E. damascena*.

Empis (Polyblepharis) soror sp. n. ♂♀.

A species allied to *E. pulchripes* Lw., having thorax with dense but not very fine black bristly hairs on front part, and four narrow dark stripes, but front legs, middle femora and all tarsi, black. Halteres yellow.

♂. Head as in *E. damascena*, but occiput and palpi with rather stronger bristles and latter not yellowish at tip. Face usually with 1–2 small bristly hairs on each side above. Thorax dull dark grey, with four rather narrow, darker, brownish-black, stripes; as usual the middle stripes and hinder part of side stripes devoid of hairs; no strong acrostichals or dorso-centrals except for about 4 pairs of latter behind. Humeri with black bristly hairs of which 1–2 behind are stronger, about 2 posthumeral, 5 notopleural, 1–2 supra-alar, 1 long and 1 short postalar, and four scutellar bristles. Prothoracic sternum with numerous long pale hairs at sides and some scattered ones extending downwards almost to tip; episterna with a few shorter and metapleura with numerous very long pale hairs. Abdomen very much as described for *damascena*, but no strong bristles at sides of tergites and hairs on last two sternites blackish. Legs coloured as stated above, but front tibiae often obscurely reddish about base, tip of hind femora narrowly, and extreme base and tip of four posterior tibiae, darkened. Coxae black, dusted greyish like pleurae, with some black bristles on outer side and pale hairs in front. Front femora with an antero-ventral row of short fine bristles, 1–2 towards tip being longer and stronger; behind towards tip rather densely clothed with black bristles and hairs. Front tibiae with some long bristly hairs behind mixed with shorter dark hairs, and a strong ventral preapical bristle; basal segment of front tarsi very little thickened, with hairs behind similar to those on tibiae but shorter, a row of 4–5 spines beneath, and a circlet of longer bristles round tip. Middle femora without bristles, the short black hairs a little longer and denser towards base beneath; middle tibiae with a double row of long strong bristles above, and a few shorter ones on apical $\frac{1}{2}$–$\frac{2}{3}$ beneath, the postero-ventral ones much shorter; basal segment of middle tarsi with very long strong spines beneath and in front, a long fine bristle or two above, besides usual apical bristles. Hind femora with no distinct bristles (except a small antero-dorsal and 2–3 small antero-ventral near tip) and short-haired; hind tibiae with 8–10 bristles above, shorter than on middle tibiae, 3–4 short antero-ventral, and usual circlet round tip, including a strong one in "comb" behind; basal segment of hind tarsi rather thickened especially about base, very distinctly spinose beneath and round tip, rather densely black-haired with 1–2 longer bristly hairs above. Wings slightly yellowish-brown—about as in *E. opaca*; cubital and discal veins slightly more divergent at tip than in *E. damascena* but less so than in *E. haemorrhoica*.

♀. Resembling male. Frons almost as broad as face, dusted greyish, with a few dark hairs in more than a single row each side. Palpi with shorter bristles and usually pale about base. Thoracic hairs only slightly shorter. Abdomen pointed with slender terminal papillae. Legs coloured as in male; front femora even more densely clothed behind (or postero-ventrally) towards tip; front tibiae and basal segment of tarsi comparatively short-haired behind. Middle femora much more densely black-haired beneath especially antero-

ventrally; basal segment of middle tarsi short-haired above but very spinose beneath. Hind femora with rather more numerous and slightly longer hairs; basal segment of hind tarsi shorter-haired above. Wings as in male.

Length about 8·5 mm.

Described from three males and five females, in my collection, taken in the neighbourhood of Constantinople in May 1911 and 1912 and given to me by Baron Surcouf, and Abbé O. Parent.

E. pulchripes Lw. appears to differ in having finer thoracic hairs with some pale ones intermixed on front part; legs with middle and hind femora yellow, and all tibiae darkened.

It is unusual for species in this group to have hairs on lower part of prosternum, a character general in the *tessellata–femorata* (*Pachymeria*) group. That *E. soror* belongs to the subgenus *Polyblepharis* is, however, proved by the structure of the male genitalia.

Empis (Polyblepharis) heliciphora sp. n. ♂.

A species with only three narrow dark stripes on thorax; apparently resembling *E. spirifera* Bezzi in its coiled-up penis, but basal antennal joints dark, abdomen extensively black-haired, hypopygium darker and anterior tibiæ bearing bristles.

♂. Eyes practically touching on frons with upper facets not enlarged. Occiput, frontal triangle, and short face (except for its shining mouth-edge), dull dusted greyish. Postocular ciliation rather long near vertex but very short at sides, some stronger scattered black bristles and hairs on upper part of occiput, but long fine pale hairs on hinder part of lower half. First two antennal segments short, dark, and bearing only short hairs (third segment missing). Palpi yellowish, with very few pale bristly hairs. Thorax dull dark grey, a little brownish on dorsum; middle dark stripe narrowest, and from some points of view almost disappearing. Acrostichals and dorso-centrals short and fine, former biserial ending at front margin of prescutellar depression, latter at least triserial and with only one pair of strong prescutellar bristles. Humeri with one strong bristle behind and some outstanding black bristly hairs in front, 1 posthumeral, 3–4 notopleural, at least one strong supra-alar and postalar, and 4–6 scutellar bristles. Prothoracic collar with a number of strong black bristles above and some pale hairs at each side, episterna bare, sides of prosternum with numerous long pale hairs; spiracles whitish; metapleural bristles pale. Abdomen long and semitubular, dusted like thorax but extreme hind margins of tergites less dusted, seventh tergite with a slight concavity each side. Venter dusted greyish; eighth sternite with a rather elongate tawny tubercle on each hind corner, and some bristly black hairs on hind margin. Hypopygium (fig. 1) with its pointed upper lamellae and part of side lamellae tawny; basal part of penis tawny but most of coiled part shining black. Some yellowish hairs at sides of first two tergites and 1–2 strong black bristles at hind corners of second tergite, the short hairs on rest of abdomen mainly black but some pale ones at sides. Legs tawny-yellow with tarsi darker, the coxae black, dusted greyish like pleurae, their pubescence pale but bristles black. Front femora short-haired and without distinct bristles; middle and hind femora with antero- and postero-ventral rows of short, rather spinose, bristles, a little more numerous towards tip of hind femora which have in addition an antero-dorsal row of 4–5 bristles towards tip and 2–3 bristles behind on basal half. All tibiae with a double row of short bristles above and rather dense fine hairs beneath; a distinct bristle in " comb " at tip of hind tibiae behind. Front tarsi slender, and all tarsi with short bristles at end of each joint, and a few beneath basal joint; basal segment of hind tarsi also with two pairs of short bristles above. Ungues and pulvilli rather long. Wings

slightly yellowish, axillary excision acute, cubital vein ending before wing tip, anal vein continued to wing margin, no long bristle at base of costa. Squamae and halteres yellow.

Length 9 mm.

One male from Angora, May 1912, given to me by the Abbé O. Parent.

It is unusual for a species of *Polyblepharis* to have only three dark stripes on thorax, most of them if striped have four, but the above species will otherwise fit into no other group except this.

Empis (Pachymeria) spiralis (Bezzi *in litt.*) sp. n. ♂♀.

Allied to *E. picipes* Mg. (*brevicornis* Lw.) and *nepticula* Lw., having prosternum hairy all over, discal cell not blunt ended, and a strong bristle in " comb " at tip of hind tibiae behind.

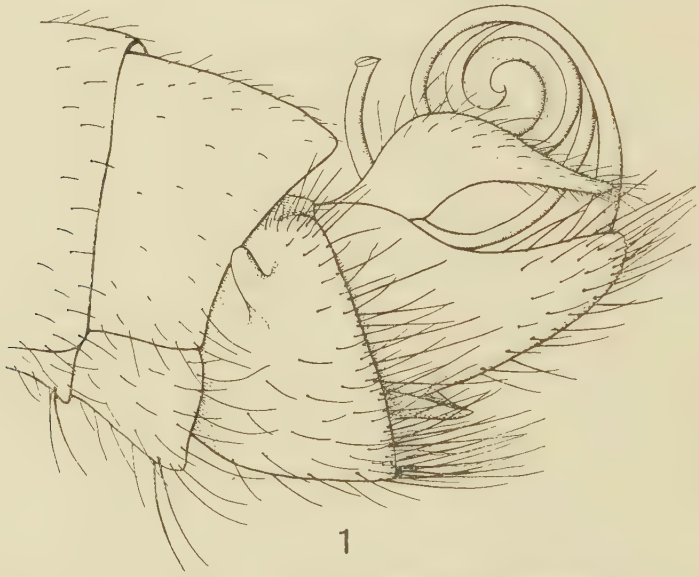

Fig. 1.—End of abdomen of *Empis* (*Polyblepharis*) *heliciphora* sp. n. ♂.

♂. Eyes touching on frons with upper facets only a little larger than lower. The small frons above antennae, face, and occiput dusted greyish, latter with black bristly hairs, shorter, and still finer below. Antennae rather short, the two almost equally short basal segments reddish, and with a few short black hairs; third segment black, stout on basal half, rapidly tapering on lower side to tip and ending in a short style $\frac{2}{3}$ its length. Palpi reddish, very slender, slightly dilated at tip and bearing short black bristles. Thorax grey dusted, with some indications of three darker grey stripes down lines of bristles. Both acrostichals and dorso-centrals biserial, not very long or strong except for two uniserial pairs of latter behind. A humeral, intrahumeral, posthumeral, 3 notopleural, 1–2 supra-alar, a postalar, and four scutellar bristles, in addition a number of dark hairs on and behind humeri, and in front of supra-alar bristle, prothoracic episterna and whole of prosternum with dark bristly hairs; metapleural fan of bristles somewhat transverse with long bristles above and shorter hairs below, all dark. Abdomen mainly shining black except on first segment and venter, though there are indications of dust about middle of all tergites. Pubescence black, and long black hindmarginal bristles at sides of tergites and about middle of sternites. Penis

(fig. 2) with remarkable convolutions giving rise to Bezzi's choice of a name. Lower side of side lamellae and hind margin of last sternite with long black bristles. Legs with black femora (front pair somewhat tawny-brown), and tawny tibiae and tarsi; coxae black, dusted with grey, bearing black bristles and hairs; front femora not densely haired anywhere, postero-dorsally with a row of bristly hairs, and on apical half, 5–6 similar hairs in front and 2–3 behind; other legs withdrawn in type and not easily examined, middle femora with an antero-ventral row of long bristly hairs, and beneath on basal half stout bristles in a double row, those near base more numerous and shorter; hind femora with apparently only long fine hairs beneath but 2–3 antero-dorsal ones towards tip and apical ones in front. Front tibiae soft-haired behind, a postero-dorsal row of about 14 longer bristly hairs, and an antero-dorsal row of shorter ones; middle tibiae with long strong bristles in two rows both above and beneath, the last 2–3 pairs beneath towards tip notably shorter; hind tibiae not lengthened or compressed with a double row of bristles above, and at least an antero-ventral row of short bristles of which about the last four close to tip are very short; basal segment of all tarsi spinose beneath, that of hind tarsi stouter and with 3–5 short bristles above. Wings

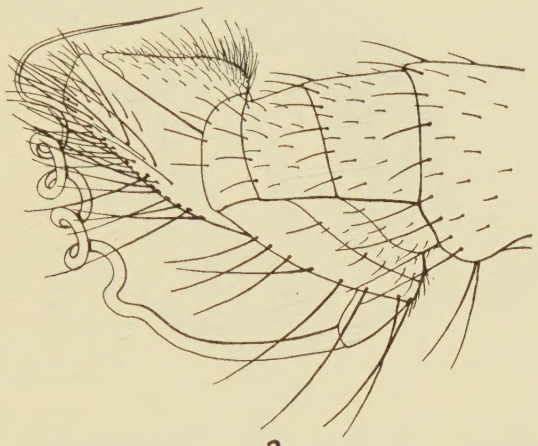

Fig. 2.—End of abdomen of *Empis* (*Pachymeria*) *spiralis* sp. n. ♂.

clear, with a whitish tinge, and a very pale yellow, glassy stigma; veins all complete, yellowish, especially about base. Halteres pale.

♀. Frons about as wide as face, black, very slightly dusted greyish, with a single row on each side of black bristly hairs. Occipital bristles rather stronger than in male. Thoracic hairs and bristles not shorter, and some hairs on humeri even more bristle-like, than in male. Abdomen pointed and all bristles and hairs very short, tergites often more extensively dusted, terminal papillae narrow. Legs shorter-haired than in male; front tibiae behind quite short-haired; middle femora with only a few inconspicuous bristles about base beneath; bristles beneath middle and hind tibiae not quite so numerous; hind tarsi more slender. Wings with a faint yellowish, rather than whitish, tinge.

Length 4·5 mm. ♂, about 5 mm. ♀.

Described from one male and three females from Syria, while I possess a female from Rouiba, Algeria, taken by Baron J. Surcouf, and there are specimens from Cyprus in the British Museum.

Though the Syrian specimens were returned to Dr. Villeneuve by Bezzi with the suggested name of *spiralis* sp. n., he does not appear to have published a

description. The Syrian *E. spirifera* described by Bezzi in 1909 must be quite distinct in having whitish-yellow metapleural and prothoracic hairs, and pale-haired abdomen, and probably belongs to the subgenus *Polyblepharis*.

Empis nigropilosa sp. n. ♂.

Very much resembling *nigricoma* Lw. and *pilosa* Lw., having numerous fine dark hairs on front part of thorax without distinct humeral or posthumeral bristles; but differing in having prosternum bare below (between front coxae), a distinctive hypopygium, and small differences in chaetotaxy of legs.

♂. Compared with *nigricoma* Lw.:—Head very similar with numerous long fine dark hairs on occiput, antennae and palpi black, the latter with numerous black bristly hairs. Thorax slightly more greyish-black than in *nigricoma* with a narrow bare line each side of quadriserial acrostichal hairs, as in that species and these hairs not extending to scutellum; 2–3 pairs of strong uniserial posterior dorso-centrals, three notopleurals, a supra-alar, a

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Fig. 3.—End of abdomen of *Empis nigropilosa* sp. n. ♂.

postalar, and only four scutellar bristles (usually more in *nigricoma*). Abdomen black with a greyish-brown sheen in some lights, pubescence as in *nigricoma* long and bristly at sides about base becoming shorter towards tip, short and adpressed on disc; venter with a pair of long diverging bristly hairs on middle of each hind margin. Hypopygium (fig. 3) with upper lamellae of different shape, side lamellae with longer more bristly hairs, and penis longer and more slender. Legs very much as in *nigricoma* but hind legs rather shorter. Front legs distinctly hairy but without bristles, front femora with antero- and postero-ventral row of rather long fine hairs, basal segment of front tarsi quite half length of tibia, but scarcely so stout, clothed with short dense pubescence behind, similar to that on tibia, with longer hairs (but not so long as on tibia) above, and 4–5 fine antero-ventral spines hidden in pubescence. Middle femora with a antero- and postero-ventral row of long bristles as in *nigricoma* (not clustered about base), but bristles of antero-dorsal row much longer and less numerous, 4–5 just before middle being longest; middle tibiae with fewer and shorter bristles than in *nigricoma* especially beneath, some weak bristles and hairs above, the strongest being the preapical dorsal, beneath with three postero-ventral only; basal segment of middle tarsi slender with a short spine beneath at base and tip otherwise only minute points beneath. Hind femora hairy beneath about base continued as an antero-

ventral row only of a few bristly hairs, quite short-haired behind but towards tip these hairs are upcurved as they often are in species of *Empis* sens. strict. (though not so in *nigricoma*). Hind tibiae not so long or laterally compressed as in *nigricoma* with hairs and bristles above (longer towards tip) and only short hairs beneath; basal segment of hind tarsi hardly thickened, strongly spinose beneath and with a few long bristly hairs above. Wings faintly yellowish with long yellowish-brown stigma, all veins complete, lower branch of cubital fork decidedly down curved and ending near wing tip, upper branch short, discal cell very truncate, axillary incision very acute. Squamae with blackish margins and dark fringes. Halteres black with brownish stem.

Length 4·5 mm.

A single male from Syria, captured by M. Gadeau de Kerville.

Empis insulata sp. n. ♂.

A small greyish-black species without dense pubescence on thorax; halteres yellow; prothoracic, metapleural, and abdominal pubescence pale, and anal vein not reaching wing margin.

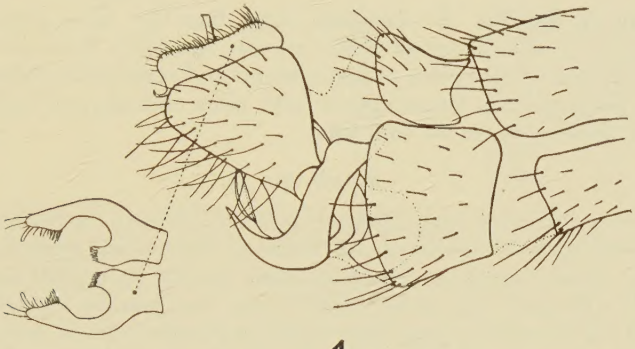

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Fig. 4.—End of abdomen of *Empis insulata* sp. n. ♂ (macerated).

♂. Eyes touching on frons with upper facets only slightly larger than lower. Occiput black, dusted with grey, with black bristly hairs above (not numerous or long), and finer paler hairs below. Antennae short, black, the two equally short basal segments with only short dark hairs, third segment stout at base, very slender towards tip with a stout style about three-quarters its length. Palpi black with short dark bristles. Thorax black, dusted greyish and with indications of brownish stripes at least down lines of dorso-central bristles. Both acrostichals and dorso-centrals irregularly biserial (almost uniserial), the former short, latter longer with two pairs behind still longer and stronger; a long upcurved humeral, an intrahumeral, posthumeral, 3 notopleural, 1–2 supra-alar, a postalar, and four scutellar bristles; only sides of prosternum with rather short pale hairs, episterna with 1–2 brownish hairs, collar with rather short dark bristly hairs; metapleura with pale hairs though 1–2 upper stronger bristles are blackish. Abdomen similar in colour to thorax, perhaps slightly less dusted; pubescence longer and whitish about sides towards base, shorter and darker above and towards tip. Venter also dusted greyish with scattered pale hairs and a pair of yellowish divergent hindmarginal bristly hairs near middle of each sternite. Hypopygium (fig. 4) small, upper lamellae slightly projecting beyond side lamellae, penis upright and fairly straight. Legs black, dusted greyish (particularly front tibiae), with middle legs rather conspicuously fringed with hairs. Coxae pale-haired. Front femora quite short-haired,

the hairs below about base pale; front tibiae with comparatively short and not numerous bristly hairs above, and not very densely pilose behind, this pile continued on the not thickened first tarsal segment which is otherwise without bristles. Middle femora and tibiae with an antero-ventral fringe of mixed longer bristly hairs and shorter hairs, tibiae with a somewhat similar fringe above, femora shorter-haired above but with a postero-ventral row of long bristly hairs and no long antero-dorsal bristles; basal segment of middle tarsi short-haired and not spinose beneath. Hind femora without bristles and comparatively short-haired, the hairs beneath about base pale, and no tiny upcurved hairs behind towards tip. Hind tibiae with short hairs and about 4 pairs of longer bristly hairs above, comparatively short-haired without bristles beneath; basal segment of hind tarsi not conspicuously thickened with hairs above similar to those beneath tibiae and only inconspicuously spinose beneath. Ungues and pulvilli short. Wings only very slightly yellowish-brown with elongate pale brown stigma, cubital vein very concave below towards tip, discal cell truncate with upper outer corner very little produced. Anal vein not reaching wing margin. Squamae smoky with pale fringes. Halteres pale.

Length about 3·75 mm.

Three males captured by M. Gadeau de Kerville, one labelled "Doummar 17.iv."

According to Kuntze, *E. dasypoda* Egg. has the same combination of characters given in the diagnosis of this species, but there is no mention in the original description of the colour of metapleural and abdominal pubescence. In any case *E. dasypoda* is a larger species with more club-shaped hind tibiae and more dilated basal segment to hind tarsi.

Empis sp. ♂.

A specimen from Doummar (Anti-Liban), 17.iv.1908 in very poor condition with damaged wings and without abdomen has femora and tibiae and base of first segment of hind tarsi tawny-yellow; thorax dusted greyish; front tibiae towards tip and all tarsi darkened; middle femora with some long strong bristles about base beneath; middle tibiae with antero-ventral row of numerous long black bristles but postero-ventral ones much shorter and less numerous, above with a few very long bristles; hind legs rather long, femora scantily-haired and without bristles; hind tibiae with long bristles above except near base and a few short bristly hairs about middle beneath; basal segment of hind tarsi at base as stout as end of tibia, with 2–3 bristles above and distinctly spinose beneath. Metapleural hairs dark. Halteres yellow.

Length probably 4–5 mm.

This species like the last belongs to the restricted genus *Empis*.

Empis sp. ♀.

A small black slightly grey-dusted species with very short and sparce pubescence everywhere and this (even on head and legs) all pale yellowish. Acrostichals and dorso-centrals very small and biserial with the hairs divergent, the latter ending behind in at least a pair of stronger yellow bristles. Only one pair of pale scutellar bristles. Legs slender, simple, without strong bristles or scales anywhere. Wings somewhat whitish with all veins complete and upper branch of cubital fork almost upright. Halteres broken off in both specimens.

Length about 3·25 mm.

Two females from Syria.